

Appn. No. 09/655,893

Attorney Docket No. 10541-2085

V. Remarks

Reconsideration and reexamination of this application in view of the above amendments and the following remarks is herein respectfully requested.

After entering this amendment, claims 8-20 remain pending.

Species Election

The Examiner states that only claims 8-13 read on species D of Figures 4a-e and that claims 14-20 read on non-elected species C of Figures 3a-e. The applicant respectfully traverses this decision. As shown in the table below, claims 14-20 do read on species D of Figures 4a-e, as those figures are discussed on pages 14, 15 and 16. Applicant requests that the Examiner include claims 14-20 in species D.

Claim 14	Specification Support
A method for forming a connection within a multi-layer circuit board, said multi-layer circuit board including a first pre-circuit assembly including a conductive core member	"Circuit assembly 110 is formed by "building up" or sequentially adding various layers of certain materials to a "substrate" portion 112 (a first pre-circuit assembly), which is substantially identical to substrate portion 52. Particularly, substrate portion 112 includes a ground layer or core metal portion 114, which is preferably manufactured and/or formed from a conventional solderable material (e.g. copper)." Page 14, lines 1-8.
a dielectric member which is attached to a top surface of said conductive core member	"A dielectric layer 116 is attached/coupled to the top surface of conductive layer 114 in a conventional manner . . ." Page 14, lines 8-10.

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an adhesive layer which is coupled to a top surface of said dielectric member	"[A] conventional adhesive layer 118 is applied to and substantially covers the top surface of layer 116." Page 14, lines 11-12.
a second pre-circuit assembly including a second core member and a first and second conductive member which are respectively attached to a top and bottom surface of said second core member	"Assembly 124 (a second pre-circuit assembly) includes a core metal portion 126, which is preferably manufactured and/or formed from a conventional aluminum material, and a pair of electrically conductive layers 128, 130 which are respectively attached to the opposing surfaces (e.g., top and bottom surfaces) of core metal portion 126 and which are preferably manufactured and/or formed from a conventional solderable material (e.g. copper)." Page 14, line 21-Page 15, line 2.
said method comprising the steps of: selectively forming at least one hole through said first pre-circuit assembly in a location where a connection to said conductive core member is desired to be formed;	"In the first step of the process, as shown in Figure 4(a), through holes or vias 120 are formed through substrate portion 112 in a conventional manner (e.g., by drilling). The through holes 120 are formed in locations where connections between ground member 114 and other portions of the circuit 110 are desired to be formed." Page 15, lines 13-18.
registering said second pre-circuit assembly with respect to said first pre-circuit, effective to cause a portion of said second conductive member to reside above said at least one hole;	"Pre-circuit assembly 124 is registered with respect to holes 120 such that a portion of conductive layer 128 resides above each hole 120 and such that conductive layer 130 does not reside above either hole 120 (e.g., portions of

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	conducting layer 128 which are desired to be connected to ground member 114 are aligned with through holes 120)." Page 15, lines 2-8.
attaching said second pre-circuit assembly to said adhesive layer, and	"After vias 120 are formed, a second pre-circuit assembly 124 is attached to substrate portion 112, as shown in Figure 4(b)." Page 14, lines 19-21.
selectively inserting a conductive material within said at least one hole, effective to connect said portion of said second conductive member to said conductive core member.	"Finally, as illustrated in Figure 4(e), amounts of a solder or conductive material 136 are selectively inserted into the holes 120." Page 16, lines 9-11.

Claim 15	Specification Support
The method of claim 14 further comprising the step of selectively etching at least a portion of said second core member.	"After assembly 124 is attached to layer 118, portions of aluminum member 126 are selectively and conventionally etched away to form the two-layer circuit board illustrated in Figure 4(c)." Page 15, lines 21-24.

Claim 16	Specification Support
The method of claim 14 wherein said conductive material comprises solder.	"Finally, as illustrated in Figure 4(e), amounts of a solder or conductive material 136 are selectively inserted into the holes 120." Page 16, lines 9-11.

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Claim 17	Specification Support
The method of claim 14 wherein said solder is selectively inserted into said at least one hole by use of a compression printing technique.	"Finally, as illustrated in Figure 4(e), amounts of a solder or conductive material 136 are selectively inserted into the holes 120." Page 16, lines 9-11.

Claim 18	Specification Support
The method of claim 14 wherein said conductive core member is manufactured from a copper material.	"Particularly, substrate portion 112 includes a ground layer or core metal portion 114, which is preferably manufactured and/or formed from a conventional solderable material (e.g. copper)." Page 14, lines 5-8.

Claim 19	Specification Support
The method of claim 17 wherein said first and said second conductive member each comprises a copper member.	"Assembly 124 includes a core metal portion 126, which is preferably manufactured and/or formed from a conventional aluminum material, and a pair of electrically conductive layers 128, 130 which are respectively attached to the opposing surfaces (e.g., top and bottom surfaces) of core metal portion 126 and which are preferably manufactured and/or formed from a conventional solderable material (e.g. copper)." Page 14, line 21-Page 15, line 2.

Claim 20	Specification Support
The method of claim 19 wherein said second core member comprises an	"Assembly 124 includes a core metal portion 126, which is preferably

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aluminum member.	manufactured and/or formed from a conventional aluminum material . . ."
Page 14, lines 21-23.	

Claim Rejections – 35 U.S.C. § 112

Claims 8-13 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the Examiner did not know what Applicants were referring to as a first pre-circuit assembly and a second pre-circuit assembly. It is submitted that the amended paragraphs of the specification have rendered this rejection moot.

Claim Rejections – 35 U.S.C. § 102(b)

Claim 8 was rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,801,338, to Akiyama et al ("Akiyama") and by U.S. Patent No. 4,404,059, to Livshits et al ("Livshits"). Applicant respectfully traverses these rejections.

The Examiner states that Akiyama discloses a method for connection within a multi-layer circuit board including a first pre-circuit assembly having a first conductive layer and a second pre-circuit assembly having a second conductive layer, the method comprising: forming an aperture within said first pre-circuit assembly, aligning the second pre-circuit assembly with the first pre-circuit assembly, attaching the first pre-circuit assembly to the second pre-circuit assembly, and inserting conductive material into the aperture to connect the first portion of the second conductive layer to the first conductive layer.

A careful reading of Akiyama reveals that the conductive material is initially placed between the first conductive layer and the second conductive layer and that portions of this conductive material are removed in a later manufacturing process.

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The applicant's invention differs from Akiyama in that there is an aperture formed within the first pre-circuit assembly and is aligned with the second pre-circuit assembly such that the first portion of the second conductive layer resides above the aperture. The first pre-circuit assembly is then attached to the second pre-circuit assembly and then the conductive material is inserted into the aperture to connect the first portion of the second conductive layer to the first conductive layer. The conductive material was not placed between the first conductive layer and second conductive layer at an earlier stage such as disclosed in Akiyama. Furthermore, portions of the conductive material in Akiyama must be removed in a late manufacturing process. This is not required in the present invention.

The Examiner states that Livshits discloses a method for connection within a multilayer circuit board including a first pre-circuit assembly having a first conductive layer and a second pre-circuit assembly having a second conductive layer, the method comprising: forming an aperture within said first pre-circuit assembly; aligning the second pre-circuit assembly with said first pre-circuit assembly such that a first portion of said second conductive layer resides above said aperture, attaching first pre-circuit assembly to second pre-circuit assembly and inserting conductive material into the aperture effective to connect the first portion of the second conductive layer to the first conductive layer.

A careful reading of Livshits reveals that, like Akiyama, the conductive material is placed between the two conductive layers and then is later removed by a manufacturing process. The Applicants' invention places the conductive material into the aperture after the first pre-circuit assembly is attached to the second pre-circuit assembly. Furthermore, portions of the conductive material in Livshits must be removed in a later manufacturing process.

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Also, the Examiner stated that layer 21 of Livshits represents the claimed conductive material of the present invention. Reference numeral 21 in Livshits refers to a layer of varnish that is applied after the assembly of the integrated circuits. This layer of varnish is not disclosed in the present invention. Furthermore, the layer of varnish in Livshits is non-conductive.

From this, it is submitted that Akiyama and Livshits fail to disclose the present invention. The rejection based thereon should be withdrawn.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that the present form of the claims are patentably distinguishable over the art of record and that this application is now in condition for allowance. Such action is requested.

12/17/04
Date

Respectfully submitted,

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